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IMPLEMENTATION PLAN REVIEW FOR NORTH DAKOTA REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

TRW/Environmental Services

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16. ABSTRACT

Section IV of the Energy Supply and Environmental Coordination Act of 1974, (ESECA) requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interferring with the attainment and maintenance of the national ambient air quality standards. This document, which is also required by Section IV of ESECA, is EPA's report to the State indicating where regulations might be revised.

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FOR
NORTH DAKOTA
REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

PREPARED BY THE FOLLOWING TASK FORCE:

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U. S. Environmental Protection Agency
Office of Air and Waste Management
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1.0 EXECUTIVE SUMMARY

The enclosed report is the U.S. Environmental Protection Agency's (EPA) response to Section IV of the Energy Supply and Environmental Coordination Act of 1974 (ESECA). Section IV requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interfering with the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). In addition to requiring that EPA report to the State on whether control regulations might be revised, ESECA provides that EPA must approve or disapprove any revised regulations relating to fuel burning stationary sources within three months after they are submitted to EPA by the States. The States may, as in the Clean Air Act of 1970, initiate State Implementation Plan revisions; ESECA does not, however, require States to change any existing plan.

Congress has intended that this report provide the State with information on excessively restrictive control regulations. The intent of ESECA is that SIP's, wherever possible, be revised in the interest of conserving low sulfur fuels or converting sources which burn oil or natural gas to coal. EPA's objective in carrying out the SIP reviews, therefore, has been to try to establish if emissions from combustion sources may be increased. Where an indication can be found that emissions from certain fuel burning sources can be increased and still attain and maintain NAAQS, it may be plausible that fuel resource allocations can be altered for "clean fuel savings" in a manner consistent with both environmental and national energy needs.

In many respects, the ESECA SIP reviews parallel EPA's policy on clean fuels. The Clean Fuels Policy has consisted of reviewing implementation plans with regards to saving low sulfur fuels and, where the primary sulfur dioxide air quality standards were not exceeded, to encourage States to either defer compliance regulations or to revise the SO_2 emission regulations. The States have also been asked to discourage large scale shifts from coal to oil where this could be done without jeopardizing the attainment and maintenance of the NAAQS.

To date, EPA's fuels policy has addressed only those States with the largest clean fuels saving potential. Several of these States have or are currently in the process of revising SO_2 regulations. These States are generally in the Eastern half of the United States. ESECA, however, extends the analysis of potentially over-restrictive regulations to all 55 States and territories. In addition, the current reviews address the attainment and maintenance of all the National Ambient Air Quality Standards.

There are, in general, three predominant reasons for the existence of overly restrictive emission limitations within the State Implementation Plans. These are 1) The use of the example region approach in developing State-wide air quality control strategies; 2) the existence of State Air Quality Standards which are more stringent than NAAQS; and 3) the "hot spots" in only part of an Air Quality Control Region (AQCR) which have been used as the basis for controlling the entire region. Since each of these situations affect many State plans and in some instances conflict with current national energy concerns, a review of the State Implementation Plans is a logical follow-up to EPA's initial appraisal of the SIP's conducted in 1972. At that time SIP's were approved by EPA if they demonstrated the attainment of NAAQS or more stringent state air quality standards. Also, at that time an acceptable method for formulating control strategies was the use of an example region for demonstrating the attainment of the standards.

The example region concept permitted a State to identify the most polluted air quality control region (AQCR) and adopt control regulations which would be adequate to attain the NAAQS in that region. In using an example region, it was assumed that NAAQS would be attained in the other AQCR's of the State if the control regulations were applied to similar sources. The problem with the use of an example region is that it can result in excessive controls, especially in the utilization of clean fuels, for areas of the State where sources would not otherwise contribute to NAAQS violations. For instance, a control strategy based on a particular region or source can result in a regulation requiring 1 percent sulfur oil to be burned state-wide where the use of 3 percent sulfur coal would be adequate to attain NAAQS in some locations.

EPA anticipates that a number of States will use the review findings to assist them in making the decision whether or not to revise portions of their State Implementation Plans. However, it is most important for those States which desire to submit a revised plan to recognize the review's limitations. The findings of this report are by no means conclusive and are neither intended nor adequate to be the sole basis for SIP revisions; they do, however, represent EPA's best judgment and effort in complying with the ESECA requirements. The time and resources which EPA has had to prepare the reports has not permitted the consideration of growth, economics, and control strategy tradeoffs. Also, there has been only limited dispersion modeling data available by which to address individual point source emissions. Where the modeling data for specific sources were found, however, they were used in the analysis.

The data upon which the reports' findings are based is the most currently available to the Federal Government. However, EPA believes that the States possess the best information for developing revised plans. The States have the most up-to-date air quality and emissions data, a better feel for growth, and the fullest understanding for the complex problems facing them in the attainment and maintenance of air quality standards. Therefore, those States desiring to revise a plan are encouraged to verify and, in many instances, expand the modeling and monitoring data supporting EPA's findings. In developing a suitable plan, it is suggested that States select control strategies which place emissions for fuel combustion sources into perspective with all sources of emissions such as smelters or other industrial processes. States are encouraged to consider the overall impact which the potential relaxation of overly restrictive emissions regulations for combustion sources might have on their future control programs. This may include air quality maintenance, prevention of significant deterioration, increased TSP, NO_x, and HC emissions which occur in fuel switching, and other potential air pollution problems such as sulfates.

Although the enclosed analysis has attempted to address the attainment of all the NAAQS, most of the review has focused on total suspended particulate matter (TSP) and sulfur dioxide (SO_2) emissions. This is because stationary fuel combustion sources constitute the greatest source of SO_2 emissions and are a major source of TSP emissions.

Part of each State's review was organized to provide an analysis of the SO_2 and TSP emission tolerances within each of the various AQCR's. The regional emission tolerance estimate is, in many cases, EPA's only measure of the "over-cleaning" accomplished by a SIP. The tolerance assessments have been combined in Appendix B with other regional air quality "indicators" in an attempt to provide an evaluation of a region's candidacy for changing emission limitation regulations. In conjunction with the regional analysis, a summary of the State's fuel combustion sources (power plants, industrial sources, and area sources) has been carried out in Appendix C, D, and E.

FINDINGS

- The North Dakota Implementation Plan has been reviewed for the most frequent causes for over-restrictive emissions limiting regulations. A state-wide rather than example region approach was used in developing control strategies for both TSP and SO_2; however North Dakota does have more stringent air quality standards than the NAAQS. This review found no indications that current regulations are overly restrictive in the context of Section IV of ESECA.

- There are indications of TSP attainment problems in both North Dakota AQCR's. It is postulated that a substantial portion of state TSP emissions come from agriculturally related processes which are not defined in the inventory at this time. An increase in TSP emissions would make attainment of NAAQS more difficult. Therefore, the stationary source fuel combustion particulate emission regulation is not a good candidate for revision in North Dakota.

- Data available for this report show SO_2 levels below the NAAQS in North Dakota; however, SO_2 emissions from most major fuel combustion sources are also well below regulation allowables. Significant levels of fuel switching could occur within the limits of the present emission regulations. In this context, the present regulation does not appear overly restrictive. The impact on air quality as a result of sources emitting up to regulating limits should be evaluated before further relaxation of the present SO_2 emission regulations is considered.

Figure 1. North Dakota Air Quality Control Regions

2.0 STATE IMPLEMENTATION PLAN REVIEW

2.1 Summary

A revision of fuel combustion source emissions regulations will depend on many factors. For example:

- Does the State have air quality standards which are more stringent than NAAQS?
- Does the SIP have emission limiting regulations for control of existing (1) power plants, (2) industrial sources, and (3) area sources?
- Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?
- Has the State not initiated action to modify combustion sources emission regulations for fuel savings; i.e., under the Clean Fuels Policy?
- Are there no proposed Air Quality Maintenance Areas?
- Are there indications of a sufficient number of monitoring sites within a region?
- Is there an expected 1975 attainment date for NAAQS?
- Based on reported (1973) Air Quality Data, does air quality meet NAAQS?
- Based on reported (1973) Air Quality Data, are there indications of a tolerance for increasing emissions?
- Are the total emissions from stationary fuel combustion sources lower than those of other sources?
- Do modeling results for specific fuel combustion sources show a potential for a regulation revision?
- Must emission regulations be revised to accomplish signficant fuel switching?
- Based on the above indicators, what is the potential for revising fuel combustion source emission limiting regulations?
- Is there a significant Clean Fuels Saving potential in the region?

The following portion of this report is directed to answering these questions. An AQCR's potential for revising regulations increases when there are affirmative responses to the above.

The initial part of the SIP review report, Section 2 and Appendix A, was organized to provide the background and current situation information for the State Implementation Plan. Section 3 and the remaining Appendices provide an AQCR analysis which helps establish the overall potential for revising regulations. Emission tolerance estimates have been combined in Appendix B with other regional air quality "indicators" in an attempt to provide an evaluation of a region's candidacy for revising emission limiting regulations. In conjunction with the regional analysis, a characterization of the State's fuel combustion sources (power plants, industrial sources, and area sources) has been carried out in Appendix C, D, E.

Based on an overall evaluation of EPA's current information, AQCR's have been classified as good, marginal, or poor candidates for regulation revisions. The following table summarizes the State Implementation Plan Review. The remaining portion of the report support this summary with explanations.

2.2 AIR QUALITY SETTING - STATE OF NORTH DAKOTA

The state of North Dakota was divided into two air quality control regions - AQCR. They are as follows:

130 Fargo - Moorhead interstate air quality control region

172 North Dakota intrastate air quality control region

See Figure A-1.

A summary of the Federal and North Dakota air quality standards for the pollutants under study is presented in the Table A-3. North Dakota has adopted the Federal secondary standards for total suspended particulate as a state standard. North Dakota has adopted a series of ambient air

NORTH DAKOTA IMPLEMENTATION PLAN REVIEW SUMMARY

"INDICATIONS"	State		Fargo - Moorhead AQCR		North Dakota AQCR	
	TSP	SO_2	TSP	SO_2	TSP	SO_2
• Does the State have air quality standards which are more stringent than NAAQS?	Yes	Yes				
• Does the SIP have emission limiting regulations for control of existing:						
1) Power plants	Yes	Yes				
2) Industrial sources	Yes	Yes				
3) Area sources	No	No				
• Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?	Yes	Yes				
• Has the State <u>not</u> initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?	Yes	Yes				
• Are there <u>no</u> proposed Air Quality Maintenance Areas?			No	Yes	No	No
• Are there indications of a sufficient number of monitoring sites within a region?			Yes	No	Yes	No
• Is there an expected 1975 attainment date for NAAQS?			Yes	Yes	Yes	Yes
• Based on reported (1973) Air Quality Data, does air quality meet NAAQS?			No	N/A	No	N/A
• Based on reported (1973) Air Quality Data, are there indications of a tolerance for increasing emissions?			No	N/A	No	N/A
• Are the total emissions from stationary fuel combustion sources lower than those of other sources?			Yes	No	No	No
• Do modeling results for specific fuel combustion sources show a potential for a regulation revision?			N/A	N/A	N/A	N/A
• Must emission regulations be revised to accomplish significant fuel switching?			Yes	No	Yes	No
• Based on the above indicators, what is the potential for revising fuel combustion source emission limiting regulations?			poor	good	poor	marginal
• Is there a significant Clean Fuels Saving potential in the region?			No		No	

quality standards for oxides of sulfur. Standards exist in North Dakota for sulfur dioxide, suspended sulfates, sulfuric acid mist and sulfur trioxide. North Dakota has adopted the national standards for nitrogen dioxide for average annual levels; in addition, a standard for a 1-hour period of time has been added.

North Dakota has an extensive monitoring network for suspended particulate matter based on the density of population in the state. The network consists of sixteen stations located throughout the state. Three of the stations are located in the North Dakota portion of the Fargo - Moorhead interstate AQCR, which is one county.

Summaries of North Dakota air quality status in 1973 are presented in Table A-4 for particulate and A-5 for SO_2. The number of stations exceeding standards are presented by air quality control regions (AQCR). The highest particulate readings in the state are in the North Dakota AQCR. Both AQCR's violated the National Ambient Air Quality Standards for both annual average and 24-hour levels.

Both North Dakota AQCR's are classified priority II for TSP. The state is classified priority III for the remainder of the pollutants. At the time of submission of the North Dakota State Implementation Plan, the State was able to demonstrate attainment of the National Ambient Air Quality Standards by 1975.

2.3 BACKGROUND OF THE DEVELOPMENT OF THE CURRENT STATE IMPLEMENTATION PLAN

The State Implementation Plan control strategies and regulations were based on a state-wide approach, demonstrating attainment of particulate and sulfur oxide standards in both AQCR's.

The state regulation for the control of particulate matter includes a schedule of emissions from fuel combustion sources based on total heat input in million Btu's. These regulations apply to new or modified sources. Sources existing at the time of submission of the State Implementation Plan are limited to 0.80 pounds per million Btu of heat input for particulate emissions. Fuel combustion regulations for sulfur oxide emissions are limited to 3.0 pounds per million Btu of heat input for existing, new, or modified sources.

North Dakota does not have regulations controlling NO_2 fuel combustion emissions.

2.4 SPECIAL CONSIDERATIONS - NORTH DAKOTA

Portions of both AQCR's in North Dakota have been proposed as designated air quality maintenance areas (Table A-1). It is anticipated that special requirements for these areas will be developed by the state and submitted to EPA as modifications to the Implementation Plan. Virtually all major present and planned fuel combustion sources are located in the counties where portions of AQCR's are proposed as designated AQMA's. The North Dakota portion of the Fargo - Moorhead interstate AQCR (Cass county) has been designated as a AQMA for TSP, SO_2, and NO_2. The latter AQMA desiggation has been made because of the potential for natural resource development. The state of North Dakota believes that this area has a potential to exceed one or more of the natural ambient air quality standards in the 10 year period between 1975 and 1985.

ENERGY SUPPLY POTENTIAL

Vast lignite coal resources lie in 23 counties in the western portion of North Dakota. The preliminary development in the short term is slated for Mclean, Mercer and Oliver counties. The total lignite coal reserve is estimated to be 351 billion tons. Of this amount, 32 billion tons are considered potentially strippable and 15 billion tons lie in beds 5 feet or more in thickness, 100 feet or less below the surface. Abundant North Dakota water resources enhance the potential for development of the lignite coal reserve. In addition to conventional fossil fuel power plants, recent developmental work in the area of liquification and gasification of lignite and other coals has stimulated developmental planning in the three county area. Several corporations have announced plans for large scale lignite coal development and coal gasification and liquification plants to be sited in southwestern North Dakota. As plans for this coal development become more definite, North Dakota expects that it will be necessary to propose additional counties for designation as AQMA's in the future.

3.0 CURRENT ASSESSMENT BASED ON SIP REVIEW

3.1 REGIONAL AIR QUALITY ASSESSMENTS

Tables A-7 and A-8 present the emission summaries for North Dakota. According to National Emissions Data System (NEDS), for the North Dakota AQCR, 63% of particulate emissions come from fuel combustion sources, while in the North Dakota portion of the Fargo - Moorhead AQCR only 16% of particulate emissions come from fuel combustion sources. It is postulated that fugitive dust from natural and agricultural related activites is a substantial portion of measured TSP levels. Fugitive dust is not accounted for in the emission inventories at present. Fuel combustion sources are the major contributors for total SO_2 emissions on a state-wide basis (90%).

Table A-9 and A-10 present the results of estimating what the North Dakota emissions would be on a region wide basis. The largest drawback for using this approach lies in the large geographical dispersion of emission sources in the North Dakota AQCR's. The analysis is intended to give an "indication" of potential areas for relaxation.

Tables B-1 and B-2 summarize the general data for each pollutant by AQCR that must be considered when estimating the potential for regulation relaxation. The analysis was performed to determine if there were any obvious combustion source candidates. Based on numerous violations of NAAQS, there is no indication that the regulations are too stringent for total suspended particulate emissions; however SO_2 air quality data indicates a potential "tolerance" for emission increase. Individual source assessments are required to determine if the regulations are over restrictive.

3.2 POWER PLANT ASSESSMENTS

At the present time there are thirteen power plant sites in the State. All of the power plants are located in the North Dakota AQCR (172).

Ten of the power plants in North Dakota are 100% coal-fired. The Jamestown Power Plant has two units; one unit is 100% coal-fired, the other unit is 100% oil-fired. The Williston Power Plant is 100% natural gas-fired. The Young-Center Power Plant is the only plant in North Dakota

that has a multi-fuel capability. Table C-1 presents relevant data on all power plants presently in operation in North Dakota. It was generally found that plants were emitting well under regulations for SO_2 and were at or over regulations for particualtes. All plants are on compliance schedules to meet emission regulations.

Table C-2 lists all known projected power plants (1975-1985). These are large coal-fired installations. Both of these plants are to be located adjacent to the coal source.

3.3 INDUSTRIAL/COMMERCIAL/INSTITUTIONAL SOURCE ASSESSMENT

All major stationary fuel combustion sources in the State of North Dakota were reviewed (Table D-1). Emission/regulation status was similar to power plants for TSP and SO_2, over for TSP and under for SO_2. In the Fargo - Moorhead AQCR (130) there are three major industrial fuel combustion sources. Each of them uses a single fuel source and are not capable of fuel conversion. In the North Dakota AQCR (172), nine sources in the state are capable of fuel conversion and additional analysis has been performed. (See 3.5 and Appendix F)

3.4 AREA SOURCE ASSESSMENT

The State of North Dakota was found to have no area sources which could be evaluated within the context of Section IV of ESECA.

3.5 IMPACT OF FUEL SWITCHING

An analysis of fuel combustion sources was made to determine the feasibility of conversion to coal or oil and its resulting impacts on emissions and regulations. The candidate sources for fuel switching identified in Appendix C and D were evaluated to determine the potential for relaxation of regulations. The percentage of coal utilized was estiamted by translating all fuel used into total annual heat input and directly proportioning on the basis of the percent of annual heat input contributed by each fuel type. The emissions resulting from conversion to coal or oil at these candidate combustion sources were estimated and compared to current emissions (Table F-1 and F-2).

Table F-1 presents the Young-Center power plant existing and potential emissions based on 100% coal utilization with present equipment. The power plant would not meet present particulate emissions regulations without additional controls. Based on current emissions and existing ambient air quality, the Young-Center Power Plant would not be a good candidate for full conversion to coal.

Table F-2 presents the emissions resulting from a fuel switch for major industrial sources with a dual fuel capability. All of the candidate industrial sources use a combination of oil and natural gas for fuel. Consequently, the conversions were made to 100% oil utilization. The calculations assume present control equipment.

The power plant analysis indicated that for total suspended particulates, the increase in projected emissions with fuel conversion will be significant. Ambient air quality standards will probably not be met. Consequently, further relaxation of TSP regulations should not take place. The industrial source analysis indicated switching to 100% oil utilization would not adversely affect air quality. Emissions after conversion would still not exceed allowable emissions for the individual sources.

- State implementation plan information
- Current air quality information
- Current emissions information

Tables in this appendix summarize original and modified state implementation plan information, including original priority classifications, attainment dates, ambient air quality standards, and fuel combustion emission regulations. SAROAD data for SO_2 and TSP monitoring stations are shown for AQCRs in the state. NEDS emissions data by AQCR[1] are tabulated and broken down into fuel burning categories.

Tables A-9 and A-10 show a comparison of emission inventories in the original SIP and those from the NEDS. An emission tolerance, or emission tonnage which might be allowed in the AQCR and still not violate national secondary ambient air quality standards, is shown for SO_2 and particulates. The intent of this calculation is to indicate possible candidate regions for fuel switching. Tolerance was based on either the degree of control expected by the SIP or upon air quality/emission relationships which are calculated from more recent data. The value of the emission tolerance provides an indication of the degree of potential an AQCR possesses for fuel revisions and regulation relaxation.

Methodology for Increased Emissions Tolerance

A tolerance for increased emissions was determined as follows. First, an "allowable emissions" was calculated for each AQCR based on the current NEDS data and the present reduction (or increase) required to meet the national secondary ambient air quality standards in that AQCR (worst case from Tables A-4 and A-5). This "allowable" was then compared to that from the SIP. If reasonable agreement occurred, then the "estimated emissions" which would result after implementation of the SIP in that AQCR were used to calculate an emissions tolerance. Thus, some credit could be given to an AQCR which might be restricting emissions more than required by ambient air quality standards. For instance, emission controls applied to AQCRs

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[1] "1972 National Emissions Report," EPA - 450/2-74-012, June 1974.

other than the example region for the state may reduce emissions well below "allowables." In the event that no data existed or was available from the SIP for an AQCR, the current air quality was used to assign emissions tolerance based on proportional rollback or rollup. Current air quality was also the criteria, if emissions data from SIP and NEDS did not appear to be comparable (this is often the case).

When no SIP emissions data was available, and current air quality levels were less than one half of the level represented by an ambient air quality standard, no "rollup" emissions tolerance was calculated in Tables A-9 and A-10. This arbitrary cutoff point was chosen so as not to distort the emissions tolerance for an area. At low levels of a pollutant, the relationship between emissions and air quality is probably not linear. Although this cutoff may leave some AQCRs with no quantifiable emissions tolerance, it was felt that no number at all would be preferable to a bad of misleading number.

It is emphasized that emissions tolerance is a region-wide calculation. This tolerance obviously makes more sense in, say, an urban AQCR with many closely spaced emissions sources than in a largely rural AQCR with geographically dispursed emissions.

Table A-1. North Dakota AQCR Priority Classification and AQMAs

AQCR	Fed. #	Priority Classification			Demographic Information			Proposed AQMA Designations [d]		
		Part.[a]	SO_x [b]	NO_x [c]	Population 1970	Square Miles	Population Density	TSP Counties	SO_x Counties	NO_x Counties
Metro Fargo Moorhead [e]	130	II	III	III	120,261	2,794	43.0			
North Dakota portion					73,653	1,749	42.1	(1) Cass	None	None
North Dakota	172	II	III	III	544,139	67,530	8.06	(3) McLean, Mercer, Oliver	(3) McLean, Mercer, Oliver	(3) McLean, Mercer, Oliver

Criteria Based on Maximum Measured (or Estimated) Pollution Concentration in Area

Priority	I Greater than	II From - To	III Less than
[a]Particulate matter			
Annual geometric mean ..	95	60 - 90	60
24-hour maximum	325	150 - 325	150
[b]Sulfur oxide:			
Annual arithmetic mean .	100	60 - 100	60
24-hour maximum	455	260 - 455	260
[c]Nitrogen dioxide	110		100

[d]Federal Register, August 1974, SMSA's showing potential for NAAQS violations due to growth.

[e]Interstate

Figure A-1. North Dakota Air Quality Control Regions

Table A-2. North Dakota Attainment Dates

AQCR#	Name	Particulates Attainment Dates Primary	Particulates Attainment Dates Secondary	Sulfur Dioxide Attainment Dates Primary	Sulfur Dioxide Attainment Dates Secondary	Nitrogen Oxides Attainment Dates
130	Metro Fargo - Moorhead	2/75	2/75	a	a	a
172	North Dakota	2/75	2/75	a	a	a

[a] Ambient air quality was below NAAQS when SIP was submitted

Table A-3. North Dakota Ambient Air Quality Standards

Expressed as $\mu g/m^3$

		Total Suspended Particulate		Sulfur Oxides				Nitrogen Dioxide	
		Annual	24 hr.	Annual	24 hr.	3 hr.	1 hr.	Annual	1 hr.
Federal[1] (Nov. 1972)	Primary	75(G)	260[a]	80(A)	365[a]	--	--	100(A)	--
	Secondary	60(G)	150[a]	--	--	1300[a]	--	100(A)	--
State		60(G)	150[a]	Sulfur dioxide 60(A)	260[a]	--	715[a]	100(A)	200[b]
				Suspended Sulfates 4(A)	12[c]	--	--		
				Sulfuric acid mist, Sulfur trioxide 4(A)	12[c]	--	30[c]		

[1]Federal Regulations apply
(G) Geometric mean
(A) Arithmetic mean

[a]Not to be exceeded more than once per year
[b]Not to be exceeded over 1 percent of the time in any three month period
[c]Not to be exceeded over 1 percent of the time

Table A-4. North Dakota AQCR Air Quality Status (1973), TSP[a]

AQCR Name	AQCR #	# Stations Reporting	TSP Concentration ($\mu g/m^3$) Highest Reading Annual	Highest Reading 24-Hr	2nd Highest Reading 24-Hr	# Stations Exceeding Ambient Air Quality Standards Primary Annual	Primary 24-Hr[c]	Secondary Annual	Secondary Annual %	Secondary 24-Hr[c]	Secondary 24-Hr %	% Reduction Required to Meet Standards	Standard on Which Reduction Is Based
Fargo-Moorhead[b]	130	7	81	503	337	1	7	2	29	7	100	55	24-hour
North Dakota portion		3	81	488	377	1	3	1	33	3	100	55	Secondary
North Dakota	172	13	120	1153	587	1	6	2	15	10	77	74	Standard

[a] 1973 air quality data in National Air Data Bank as of June 7, 1974
[b] Interstate
[c] Violations based on more than one reading in excess of standards
[d] Formula: $\frac{\text{2nd highest 24-hr - secondard 24-hr standard}}{\text{2nd highest 24-hr}} \times 100$

Table A-5. North Dakota AQCR Air Quality Status (1973). SO_2[a]

AQCR Name	AQCR #	# Stations Reporting 24-Hr (Bubbler)	# Stations Reporting (Contin.)	SO_2 Concentration ($\mu g/m^3$) Highest Reading Annual	Highest Reading 24-Hr	2nd Highest Reading 24-Hr	# Stations Exceeding Ambient Air Quality Stds. Primary Annual	Primary 24-Hr[c]	Secondary 3-Hr	% Reduction[d] Required To Meet Standards	Standard on Which % Reduction Is Based
Fargo-Moorhead[b]	130	2	NS	NDA	68	23	0	0	0	meets standards	
North Dakota portion		0	0	-	-	-	-	-	-		
North Dakota	172	NS	NS	NS	NS	NS	NS	NS	NS	meets standards	

[a] 1973 air quality data in National Air Data Bank as of June 7, 1974
[b] Interstate
[c] Violations based on more than one reading in excess of standards
[d] Formula: $\frac{\text{2nd highest 24-hr - primary 24-hr standard}}{\text{2nd highest 24-hr}} \times 100$

Table A-6. North Dakota Fuel Combustion Source Summary[a]

AQCR	AQCR #	North Dakota Power Plants NEDS[b]	North Dakota Power Plants FPC[c]	Other Fuel Combustion Point Sources[b] Particulate	Other Fuel Combustion Point Sources[b] SO_2
Fargo-Moorhead	130	0	0	3	2
North Dakota	172	13	5	11	12

[a]Only sources in North Dakota are included
[b]All sources from National Emission Data Bank listing
[c]Federal Power commission information for 1973 for major power plants

Table A-7. North Dakota Emissions Summary, SO_2 (10^3 tons/year)

AQCR	Total (10^3 Tons/Year)	Percent Fuel Combustion	Electricity Generation		Point Source Fuel Combustion		Area Source Fuel Combustion	
			(10^3 Tons/Year)	%	(10^3 Tons/Year)	%	(10^3 Tons/Year)	%
Fargo-Moorhead[a] (130)	6.5	93	0.46	7.1	1.4	21.5	4.2	64.6
North Dakota portion	2.3	89	0	0	1.4	60.9	0.65	28.3
North Dakota (172)	83.7	91	56.9	68	9.5	11.4	9.5	11.4

[a]Interstate emissions based on total of all counties in all states.

Table A-8. North Dakota Emissions Summary, Particulates (10^3 tons/year)

AQCR	Total (10^3 Tons/Year)	Percent Fuel Combustion	Electricity Generation		Point Source Fuel Combustion		Area Source Fuel Combustion	
			(10^3 Tons/Year)	%	(10^3 Tons/Year)	%	(10^3 Tons/Year)	%
Fargo-Moorhead [a] (130)	20.7	32	0.05	0.02	5.1	2.5	1.4	0.68
North Dakota portion	14.1	16	0	0	1.5	11	.75	0.05
North Dakota (172)	72.6	63	37.4	51.5	2.3	3.2	5.7	7.9

[a]Interstate emissions based on total of all counties in all states.

Table A-9. North Dakota Required Emissi[illegible]eductions, Particulates

	SIP					1973 Data				
	AQ					AQ				
AQCR	Meas.	%[a] Red.	Emissions (10^3 tons)	Allowable Emissions (10^3 tons)	1975 Estimated Emissions After Controls (10^3 tons)	Meas.	%[a] Red.	NEDS Emissions (10^3 tons)	Allowable Emissions (10^3 tons)	Emission Tolerance (10^3 tons)
Fargo-Moorhead[b] 130	71	21.2	18.7	14.7	1.69	81	33	14.1	9.3	0
North Dakota 172	79	31.7	9.8	6.7	3.5	120	59	72.6	29.8	0

[a]Background is 19 $\mu g/m^3$

[b]North Dakota portion of Interstate.

Table A-10. North Dakota Required Emission Reduction, SO_2

	SIP				1973 Data			
AQCR	AQ Measurement Control Value	Emissions (10^3 tons)	Allowable Emissions (10^3 tons)	1975 Estimated Emissions After Controls (10^3 tons)	Reduction Required Based On 1973 AQ Data	NEDS Emissions (10^3 tons)	Allowable Emissions (10^3 tons)	Emission Tolerance (10^3 tons)
Fargo-Moorhead 130	<50[a]	2.76	--	.65	increase	2.3	4.2	1.9
North Dakota 172	b	8.5	--	8.2	b	83.7	--	--

[a]North Dakota portion of Interstate
[b]No air quality data available

Table A-11 North Dakota Fuel Combustion Regulations

	Existing Sources	New Sources	lbs/hr/10^6 Btu
Particulate	Shall not exceed 0.80 pounds per million Btu of heat input	Fuel Input 10^6 Btu/hr	
		10 or less	0.600
		100	0.443
		1,000	0.328
		10,000	0.242
		100,000	0.180
Sulfur Dioxide	Shall not exceed 3.0 pounds per million Btu of heat input	Shall not exceed 3.0 pounds per million Btu of heat input	

APPENDIX B

Tables B-1 and B-2 are the assessment of AQCRs which should be examined for the fuel switching impact on particulate and SO_2 emissions. They also provides an identification of those AQCRs which show little potential for fuel revision or regulation relaxation if ambient air standards are to be attained.

Those AQCRs designated "high" or "medium" here will be examined in later appendices where an attempt will be made to estimate the emissions resulting from an assumed fuel schedule different from the present, or the emissions which might result if all fuel burning sources emitted up to their "allowables."

The criteria for candidates are (1) the severity and breadth of air quality violations, (2) the tolerance for emissions increased in the AQCR, (3) the fraction of total emissions resulting from fuel combustion, and (4) AQMA designations. It should be noted that an AQCR may not necessarily need relaxation of regulations in order to accomplish fuel switching. Further, a good candidate in Tables B-1 and B-2 may later show little potential for fuel switching after individual sources are examined. Finally it is possible that an AQCR may have air quality levels below standard at present and may require more <u>strict</u> regulations than currently exist if all fuel burning sources were converted to dirtier fuels, i.e., "average" emission rate now may be below "average" regulations.

Table B-1. Candidacy Assessment for Relaxation of TSP Regulations

AQCR	Air Quality: Monitors	Air Quality: Violations	Expected Attainment Date	Any Counties AQMA Designations?	Total Emissions 10^3 tons/yr.	% Emission from Fuel Combustion	Tolerance for Emissions Increase (10^3 tons)	Overall Regional Evaluation
Fargo Moorhead 130	3	3	2/75	1	14.1	16	0	poor
North Dakota 172	13	10	2/75	3	72.6	63	0	poor

Table B-2. Candidacy Assessment for Relaxation of SO_2 Regulations

AQCR	Air Quality: # Monitors	Air Quality: # Violations	Expected Attainment Date	Any Counties AQMA Designations?	Total Emissions 10^3 tons/yr	% Emissions from Fuel Combustion	Tolerance for Emissions Increase (10^3 tons)	Overall Regional Evaluation
Fargo Moorhead 130	0	-	b	none	2.3	89	1.9	good
North Dakota 172	a	-	b	3	83.7	91	--	--

[a]No air quality data available
[b]Air quality presently below standards

APPENDIX C

This section is a review of individual power plants by AQCR. The intent is to illustrate fuel switching possibilities and particulate and SO_2 emissions resulting from these switches on an individual plant basis. The total AQCR emissions resulting from such switches is then calculated.

Current power plant information used to prepare Table C-1 were obtained from three main sources: (1) Federal Power Commission computerized listings of power plants and their associated fuel use, (2) the National Coal Association "Steam Tables" listing of power plants and fuel use in 1972, and (3) NEDS Emissions data.[1] For those plants listed by the FPC (1 above), the 1973 fuel schedule was assumed, otherwise, fuel use is for 1972. Heat inputs are those based on actual fuel values where known, and average values shown in Table C-4 were used where not known. SO_2 and particulates emissions are those associated with the fuel use shown. In the case of particulates, emissions were calculated using NEDS emissions factors applied to the listed fuel schedule (in both tonnage and lbs/10^6 Btu). When a plant was not listed in NEDS, AP 42 emission factors were used to estimate SO_2 and TSP emissions (see Table C-4).

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[1] NEDS Data Bank 1974

Table C-1A. North Dakota Power Plant Evaluation

AQCR/Number/County	Plant/ Design[a]/ Capacity	Fuel			Emissions Tons/yr			
		Type	Amount 10^3 ton/yr	Heat Input 10^6 Btu H	SO_2		TSP	
					Exist	Allow	Exist	Allow
North Dakota 172 Barnes	Valley City #2 C 5.0 MW	Coal 0.6%S 6.6%A	6.58	14	104	192	368	51
	Valley City #3	Coal 0.6%S 6.6%A	3.51	14	40	74	151	20
North Dakota 172 Grand Forks	Wood #2 C 21.5 MW	Coal 0.35%S 6.0%A	.45	14	3	15	18	2
	Wood #3	Coal 0.35%S 6.0%A	3.2	14	5	120	30	16
North Dakota 172 McHenry	Neal #1 C 38.5 MW	Coal 0.20%S 6.0%A	110	14	439	3,160	933	403
	Neal #2	Coal 0.2%S 6.0%A	94.1	14	376	3,060	800	391
North Dakota 172 Mercer	Leland Olds C 215.7 MW	Coal 0.55%S 7.2%A	1,320	14	14,500	27,900	5,530	2,470

[a]Fuel Design C=Coal; O=Oil; G=Gas

Table C-1B. North Dakota Power Plant Evaluation

AQCR/Number/County	Plant/ Design[a]/ Capacity	Fuel Type	Fuel Amount 10^3 ton/yr	Heat Input 10^6 Btu H	Emissions SO Exist	Emissions SO Allow	Tons/yr TSP Exist	Tons/yr TSP Allow
North Dakota 172 Mercer	Beulah #1 C 13.5	Coal 0.62%S 7.4%A	11.3	13	140	379	146	58
	Beulah #2	Coal 0.62%S 7.4%A	11.3	13	140	379	146	58
	Beulah #3	Coal 0.62%S 7.4%A	12.9	13	160	433	211	80
	Beulah #4	Coal 0.62%S 7.4%A	32.6	13	404	1,090	833	654
	Beulah #5	Coal 0.62%S 7.4%A	32.6	13	404	1,090	833	654
North Dakota 172 Mercer	Stanton C 172.0 MW	Coal 0.80%S 7.6%A	862	14	15,600	20,700	7,260	2,090
North Dakota 172 Morton	Heskett #1 C(G) 100.0 MW	Coal 0.71%S 6.6%A	155	14	2,340	3,840	2,020	487
	Heskett #2	Coal	411	14	4,020	9,620	3,370	1,080

[a]Fuel Design C=Coal; O=Oil; G=Gas

Table C-1C. North Dakota Power Plant Evaluation

AQCR/Number/County	Plant/ Fuel Design[a]/ Capacity	Fuel Type	Fuel Amount 10^3ton/yr	Fuel Heat Input 10^6Btu H	Emissions Tons/yr SO_2 Exist	SO_2 Allow	TSP Exist	TSP Allow
North Dakota 172 Oliver	Young-Center C/O 234.6	Coal 0.7%S 8.0%A	1,620	13	16,000	30,200	9,000	2,930
		Oil 0.3%S	794,000gal	140/1000gal	13		2	
North Dakota 172 Ramsey	Devils Lake #1 C 12.5	Coal 0.48%S 6.8%A	16.2	13	117	435	111	64
	Devils Lake #2	Coal 0.48%S 6.8%A	54	13	522	2,230	192	306
North Dakota 172 Richland	Kidder #2 C 20.5	Coal 1.03%S 6.8%A	1.05	14	21	19	47	6
	Kidder #3	Coal 1.03%S 6.8%A	18.2	14	355	381	987	101
	Kidder #4	Coal 1.03%S 6.8%A	12.2	14	239	256	663	68
North Dakota 172 Stutsman	Jamestown #1 C/O 7.5	Coal 0.85%S 6.1%A	58.9	14	500	2,210	565	303
	Jamestown #2	Oil 0.50%S	41,000gal	140/1000gal	1	32	<1	5

Table C-1D. North Dakota Power Plant Evaluation (Continued)

AQCR/Number/County	Plant/ Design[a]/ Capacity	Fuel Type	Fuel Amount 10^3ton/yr	Fuel Heat Input 10^6 Btu H	Emissions Tons/yr SO_2 Exist	SO_2 Allow	TSP Exist	TSP Allow
North Dakota 172 Ward	Bison #1 C 10.0	Coal 0.60%S 10.2%A	20.4	15	245	561	1,670	82
	Bison #2	Coal 0.60%S 10.2%A	20.4	15	245	561	1,670	82
North Dakota 172 Williams	Williston #1 G 2.0	Gas	3,970 MCF	1040/MCF	1	3	1	30
	Williston #2	Gas	3,970 MCF	1040/MCF	1	3	1	30

[a]Fuel Design C=Coal; O=Oil; G=Gas

NEDS data as of November 1974.

Table C-2 Power Plant Projected Development

AQCR	Owner	Plant	MW	Estimated Emissions NSPS		
				TSP Tons/Year	SO_2 Tons/Year	NO_x Tons/Year
North Dakota 172 Mercer	Basin Elec.	Leland Olds #2 [a,b]	460	1,628	19,559	11,408
North Dakota 172 Oliver	Minnekota Power Coop.	Milton Young [a,c]	400	1,416	17,008	9,920

[a] Coal-fired power plant
[b] Scheduled to go on-line in 1975.
[c] Scheduled to go on-line in 1977.

Table C-3. AP-42 Power Generation Emission Factors

Fuel	Particulates		SO_2		Hydrocarbons		NO_x (as NO_2)	
	Lbs/Ton	Lbs/10^6 Btu	Lbs/Ton	Lbs/10^6 Btu	Lbs/Ton	Lbs/10^6 Btu	Lbs/Ton	Lbs/10^6
Coal(1) (Bit.)								
General	160	7.4			0.3	0.013	18	0.78
Wetbottom 10% A	130	7.0					30	1.3
Cyclone	20	0.9					55	2.4
1% S	Same as Above	Same as Above	38	1.65	0.3	0.13	Same as Above	Same as Above
2% S			76	3.3				
3% S			114	5.0				
	Lb/10^3 Gal		Lb/10^3 Gal		Lb/10^3 Gal		Lb/10^3 Gal	
Oil(2)								
0.5% S	8	0.058	79	0.56	2	.014	105	0.75
1.0% S	8	.058	157	1.12	2	.014	105	0.75
2.0% S	8	.058	314	2.24	2	.014	105	0.75
	Lb/10^6 Ft^3		Lb/10^6 Ft^3		Lb/10^6 Ft^3		Lb/10^6 Ft^3	
Gas(3) (.3 lbs S/ 10^6 Ft^3)	15	.015	0.57	.00057	1	.001	600	0.60

(1) Coal 23 x 10^6 Btu/Ton

(2) Oil 140 x 10^3 Btu/Gal

(3) Gas 1000 Btu/Ft^3

APPENDIX D

The Tables D-1 in this appendix list individual industrial/commercial/institutional sources of particulates and SO_2 emissions which might show fuel switching potential. The sources are from a NEDS rank order emissions listing. At the top of Tables D-1 is the percent of total emissions (both fuel and non-fuel sources) accounted for in the AQCR, since not all sources could be listed in this report. It should be cautioned that the percent emissions accounted for is different than the "% of fuel use accounted for." It is possible that several potential fuel switch sources could be overlooked by the cutoff point on the emissions (i.e., a reasonable sized natural gas used may emit below our cutoff point in the NEDS rank order list).

Table D-1A. Major Industrial Fuel Combustion Sources[a]

AQCR	County	Source	Boiler Capacity 10^6 Btu/Hr	Fuel Type	Annual Amount	Emissions TSP Tons/Year Exist.	TSP Allow.	SO_2 Exist.	SO_2 Allow.
Fargo Moorhead 130	Cass	5 #1	35	Coal 0.92%S 7.0%A	6,130 tons	279	39	113	229
		5 #2	35	Coal 0.92%S 7.0%A	9,190 tons	418	58	169	115
		5 #3	23	Coal 0.92%S 7.0%A	2,020 tons	92	12	37	20
		5 #4	93	Coal 0.92%S 7.0%A	16,300 tons	743	91	300	609
	Cass	6	45	Gas	1,370 MCF	12	548	<1	2,060
	Cass	11	b	Oil 1.0%S	345,000gal	4	20	27	77
North Dakota 172	Barnes	4 #1	30	Coal 0.51%S 6.6%A	2,350 tons	100	13	24	49
		4 #2	24	Coal 0.51%S 6.6%A	1.7 tons (standby)	--	--	--	--
	Bottineau	101 #1	8	Oil 0.7%S	50,000gal	<1	14	2	70
		101 #2	8	Oil 0.7%S	50,000gal	<1	14	2	70
		101 #3	6	Oil 0.7%S	50,000gal	<1	12	2	57
		101 #4	4	Coal 0.4%S 6.0%A	338 tons	15	.2	3	8

[a] National Emissions Data System printout as of November 1, 1974
[b] Information not available

Table D-1B. Major Industrial Fuel Combustion Sources[a] (Continued)

AQCR	County	Source	Boiler Capacity 10^6 Btu/Hr	Fuel Type	Annual Amount	Emissions TSP Tons/Year Exist.	TSP Tons/Year Allow.	SO_2 Tons/Year Exist.	SO_2 Tons/Year Allow.
North Dakota 172	Burleigh	1	50	Gas	229 MCF	3	120	1	448
	Grand Forks	3 #1	b	b	stand by	-	--	-	--
		3 #2	b	Coal	1,440 tons	56	8	14	30
		3 #3	b	Coal	140,000 tons	546	78	137	294
		3 #4	b	Oil --%S	400,000gal	1	C	C	C
				Gas	1 MCF	1	C	C	C
		3 #5	b	Coal 0.49%S 6.0%A	14,000 tons	546	78	137	294
		3 #6	b b	Oil Gas	b b	b b	b b	b b	b b
	Morton	3 #1	172	Oil 1.76%S	5,740,000gal	43	603	717	2,260
				process gas 9.18%S	923 MCF	7		4,020	
		3 #2	213	Oil 1.76%S	9,600,000gal	72	352	1,200	1,320
				process gas 0.77%S	731 MCF	5		267	
		3 #3	222	Oil 1.76%S	10,300,000gal	77	373	1,290	1,400
				process gas 0.77%s	776 MCF	6		284	

Table D-1C. Major Industrial Fuel Combustion Sources[a] (Continued)

AQCR	County	Source	Boiler Capacity 10^6 Btu/Hr	Fuel Type	Annual Amount	Emissions			
						TSP Tons/Year Exist.	Allow.	SO_2 Tons/Year Exist.	Allow.
North Dakota 172	Morton	3 #10	56	Gas	297 MCF	3	195	<1	730
		3 #11	31	Gas	164 MCF	1	106	<1	399

[a]National Emissions Data System printout as of November 1, 1974
[b]Information not available
[c]Data not calculatable

Table D-1D. Major Industrial Fuel Combustion Sources[a] (Continued)

AQCR	County	Source	Boiler Capacity 10^6 Btu/Hr	Fuel Type	Annual Amount	Emissions TSP Tons/Year Exist.	TSP Allow.[a]	SO_2 Exist.	SO_2 Allow.[b]
North Dakota 172	Morton	3 #12	42	process gas 0.66%S	373 MCF	3	147	<1	552
		3 #13	37	Oil 0.10%S	113,000gal	<1	130	<1	487
				Gas	190 MCF	2		<1	
	Pembina	3 #1	392	Coal 0.5%S 7.8%A	90,000 tons	1,350	246	552	1,990
		3 #2	21	Coal 0.5%s 7.8%A	1,000 tons	51	12	10	64
	Ramsey	101 #1	7	Coal 0.6%S 6.6%A	441 tons	3	3	3	16
		101 #2	7	Coal 0.6%S 6.6%A	806 tons	11	5	9	23
		101 #3	13	Coal 0.6%S 6.6%A	1,260 tons	8	7	14	36
	Richland	101 #1	b	Coal 1.12%S 6.6%A	1,500 tons	64	9	32	34
		101 #2	b	Coal 1.12%S 6.6%A	1,500 tons	64	9	32	34
		101 #3	b	Oil 2.0%S	184,000gal	2	0	29	42

Table D-1E. Major Industrial Fuel Combustion Sources[a] (Continued)

AQCR	County	Source	Boiler Capacity 10^6 Btu/Hr	Fuel Type	Annual Amount	Emissions TSP Tons/Year Exist.	TSP Allow.[b]	SO_2 Tons/Year Exist.	SO_2 Allow.[b]
North Dakota 172	Richland	101 #4	b	Oil 2.0%S	184,000gal	2	0	29	64
				Gas	23 MCF	<1		<1	
	Rolette	2 #1	25	Coal 0.80%S 7.0%A	6,230 tons	394	58	100	328
		2 #2	25	Coal 0.80%S 7.0%A	b	b	b	b	b

[a] National Emissions Data System printout as of November 1, 1974
[b] Information not available

Table D-1F. Major Industrial Fuel Combustion Sources[a] (Continued)

AQCR	County	Source	Boiler Capacity 10^6 Btu/Hr	Fuel Type	Annual Amount	Emissions TSP Tons/Year Exist.	TSP Allow.[c]	SO_2 Tons/Year Exist.	SO_2 Allow.[c]
North Dakota 172	Stark	1 #1	39	Coal 1.2%S 12.0%A	21,100 tons	289	71	173	423
		1 #2	39	Coal 1.20%S 12.0%A	21,100 tons	289	71	173	423
	Stutsman	5 #1	26	Oil 2.0%S 0.1%A Gas	124,000gal 3 MCF	1 <1	20	19 <1	111
		5 #2	b	Coal 0.67%S 5.9%A	288 tons	2	2	4	6
		5 #3	b	Coal 0.67%S 5.9%A	4,800 tons	184	27	64	101
		5 #4	b	Coal 0.67%S 5.9%A	6,170 tons	237	35	83	130
	Towner	4	45	Oil	961,000gal	11	58	75	218
	Ward	4 #1	7	b	b	b	b	b	b
		4 #2	7	b	b	b	b	b	b
		4 #3	b	b	b	b	b	b	b
		4 #4	29	Coal 0.83%S 6.7%A	b	b	b	b	b

Table D-1G. Major Industrial Fuel Combustion Sources[a] (Continued)

AQCR	County	Source	Boiler Capacity 10^6 Btu/Hr	Fuel Type	Annual Amount	Emissions TSP Tons/Year Exist.	TSP Allow.	SO_2 Tons/Year Exist.	SO_2 Allow.
North Dakota 172	Ward	6 #1	178	Gas	b	b	549	b	4,010
		6 #2	60	Gas	b	b	43	b	270
	Ward	103	22	Coal 0.5%S 7.5%A	4,350 tons	212	24	41	91

[a] National Emissions Data System printout as of November 1, 1974
[b] Information not available

Table D-1H. Major Industrial Fuel Combustion Sources[a] (Continued)

AQCR	County	Source	Boiler Capacity 10^6 Btu/Hr	Fuel Type	Annual Amount	Emissions TSP Tons/Year[a] Exist.	TSP Allow.	SO_2 Tons/Year[b] Exist.	SO_2 Allow.
North Dakota 172	Williams	4 #3	100	Gas	690 MCF	6	350	<1	1,310
		4 #4	b	Gas	690 MCF	6	350	<1	1,310
	Williams	76 #2	44	Oil	b	b	b	b	b
				process gas	b	b	b	b	b

[a]National Emissions Data System printout as of November 1, 1974
[b]Information not available

APPENDIX E

The state of North Dakota found to have no area sources which could be evaluated within the context of Section 4 of ESECA.

APPENDIX F

Tables F-1 and F-2 in this appendix lists individual power plants and industrial/commercial/institutional sources capable of fuel conversion.

Table F-1. Emissions Resulting from Fuel Switch for Power Plants with Dual Fuel Capability

AQCR	Source	Present Emissions[a] TSP	Present Emissions[a] SO_2	% Coal	% Gas	% Oil	% Full Oil/ Coal Utilization	Emissions after Fuel Switch TSP Emission	TSP Allow	SO_2 Emission	SO_2 Allow
North Dakota 172	Young-Center	9,002	16,310	99.5	-	0.5	100.5(c)	9,045	2,930	16,080	30,200

Evaluation: The Young-Center Power Plant is the only dual fuel power plant in North Dakota. The North Dakota AQCR (172) currently violates particulate air quality standards and could not support an increase in particulate emissions. Based on current emissions, the Young-Center Power Plant would not be a good candidate for full conversion to coal.

[a]Based on total emissions from power plant

(c) = Coal

Table F-2A. Emissions Resulting from Fuel Switch for Major Industrial Sources with Dual Fuel Capability

AQCR	Source	Present Emissions[a] TSP	Present Emissions[a] SO_2	% Coal	% Gas	% Oil	% Full Oil/ Coal Utilization	Emissions after Fuel Switch: TSP Emission Tons/Year	TSP Allow Tons/Year	SO_2 Emission Tons/Year	SO_2 Allow[b] Tons/Year
North Dakota 172	Grand Forks										
	3 #4	1	b	-	15	85	118 (o)	1	b	b	b
	3 #6	b	b	-	b	b	--	b	b	b	b
	Morton										
	3 #1	50	47[37]	-	53	47	212 (o)	91	603	1,520	22,260
	3 #2	77	1,467	-	35	65	154 (o)	111	352	1,848	1,320
	3 #3	83	1,574	-	65	35	286 (o)	220	373	3,689	1,400
	3 #13	2	1	-	96	4	2,500 (o)	50	130	25	437
	Richland 101 #4	2	29	-	45	55	182 (o)	3.6	0	35	64
	Stutsman 5 #1	1	19	-	14	86	116 (o)	1	20	22	111

(o) = Oil

Table F-28. Emissions Resulting from Fuel Switch for Major Industrial Sources with Dual Fuel Capability (Continued)

AQCR	Source	Present Emissions[a] TSP	Present Emissions[a] SO_2	% Coal	% Gas	% Oil	% Full Oil/ Coal Utilization	Emissions after Fuel Switch: TSP Emission Tons/Year	TSP Allow Tons/Year	SO_2 Emission Tons/Year	SO_2 Allow Tons/Year
North Dakota 172	Williams 76 #2	b	b	b	b	b	b	b	b	b	b

Evaluation: All the industrial plants in North Dakota with dual fuel capability could switch to oil for combustion, without adversely affecting air quality. One plant, an oil refinery in Morton County, uses process gas for combustion and may prefer to continue internally-generated fuel. The remaining plants are candidates for fuel switching.

[a]Emissions for single source identified
[b]Information not available

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